SECTION 6 | PUBLIC LANDS MANAGEMENT AND CONSERVATION PLANNING

183. This section describes lynx conservation associated with four types of activities: 1) development and implementation of lynx management plans; 2) research efforts related to lynx conservation; 3) grazing; and 4) wildlife management.

6.1 SUMMARY OF IMPACTS TO PUBLIC LANDS MANAGEMENT AND CONSERVATION PLANNING

Post-designation Impacts in areas proposed for designation

- Undiscounted: $12.8 million
- Present value applying a seven percent discount rate: $9.95 million (annualized $940,000)
- Present value applying a three percent discount rate: $11.4 million (annualized $767,000)

Post-designation impacts in areas considered for exclusion

- Undiscounted: $7.97 million
- Present value applying a seven percent discount rate: $6.60 million (annualized 623,000)
- Present value at applying a three percent discount rate: $7.32 million (annualized $492,000)

6.1.1 PRE-DESIGNATION IMPACTS

184. To date, there have been 17 consultations considering lynx for land management activities in areas proposed for critical habitat, and six in areas considered for exclusion. All but one were related to land and resource management planning; the remaining one was related to lynx ecology research. Past consultations on grazing were conducted outside of the study area. The primary ongoing efforts related to public lands and conservation planning are the continued development of Montana Department of Natural Resources and Conservation's (MTDNRC) draft habitat conservation plan (HCP), and Washington Department of Natural Resources (WADNR) draft Lynx Habitat Management Plan. Pre-designation impacts include the development of these plans, lynx conservation research, and planning and administrative support for lynx management efforts. Pre-designation costs associated with these efforts are described in Exhibit 6-1.

EXHIBIT 6-1. PRE-DESIGNATION IMPACTS

UNIT	SUBUNIT	TOTAL PRE-DESIGNATION COSTS (UNDISCOUNTED)		TOTAL PRE-DESIGNATION COSTS (PRESENT VALUE 3%)		TOTAL PRE-DESIGNATION COSTS (PRESENT VALUE 7%)	
PROPOSED FOR CRITICAL HABITAT DESIGNATION		LOW	HIGH	LOW	HIGH	LOW	HIGH
Unit 1: Maine	Private Timber Lands	$1,850,000	$1,850,000	$2,050,000	$2,050,000	$2,350,000	$2,350,000
Unit 2: Minnesota	Superior National Forest	$57,100	$86,100	$62,600	$93,500	$70,600	$104,000
	State DNR lands	$40,400	$69,300	$43,000	$74,000	$46,600	$80,200
Unit 3: Northern Rockies	Montana Department of Natural Resources and Conservation	$306,000	$306,000	$336,000	$336,000	$381,000	$381,000
Unit 4: North Cascades	Washington Department of Natural Resources	$1,000,000	$1,000,000	$1,130,000	$1,130,000	$1,310,000	$1,310,000
TOTAL		**$3,260,000**	**$3,310,000**	**$3,620,000**	**$3,680,000**	**$4,160,000**	**$4,230,000**
PROPOSED FOR EXCLUSION							
Unit 2: Minnesota	Voyageurs National Park	$41,100	$41,100	$45,900	$45,900	$53,000	$53,000
Unit 3: Northern Rockies	Glacier National Park	$909,000	$1,210,000	$982,000	$1,310,000	$1,090,000	$1,450,000
Unit 4: North Cascades	North Cascades National Park	$141,000	$141,000	$151,000	$151,000	$164,000	$164,000
TOTAL		**$1,090,000**	**$1,390,000**	**$1,180,000**	**$1,510,000**	**$1,300,000**	**$1,670,000**

6.1.2 POST-DESIGNATION IMPACTS

185. Total post-designation impacts of lynx conservation efforts on forecast projects are summarized by subunit in Exhibit 6-2. These results rely on the assumption that all public and conservation lands will be managed consistent with lynx conservation as described in the LCAS following the designation of critical habitat for the lynx. The impacts therefore include the costs of developing lynx management plans, and associated implementation costs, such as monitoring and surveying. Quantified impacts also capture the costs of lynx conservation research projects on public and conservation lands. Additionally, this analysis describes the limited grazing activity on public lands; this activity, however, is not a major land use within the boundaries of the study area except in the North Cascades Unit, where Loomis State Forest is largely managed as grazing allotments.

EXHIBIT 6-2. POST-DESIGNATION IMPACTS

UNIT	SUBUNIT	TOTAL POST-DESIGNATION COSTS (UNDISCOUNTED)		TOTAL POST-DESIGNATION COSTS (PRESENT VALUE 3%)		TOTAL POST-DESIGNATION COSTS (ANNUALIZED 3%)		TOTAL POST-DESIGNATION COSTS (PRESENT VALUE 7%)		TOTAL POST-DESIGNATION COSTS (ANNUALIZED 7%)	
PROPOSED FOR CRITICAL HABITAT DESIGNATION		LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Unit 1: Maine	National Park Service	$284,000	$284,000	$232,000	$232,000	$15,600	$15,600	$181,000	$181,000	$17,100	$17,100
	Baxter State Park Authority	$1,400,000	$1,400,000	$1,270,000	$1,270,000	$85,600	$85,600	$1,130,000	$1,130,000	$107,000	$107,000
	Department of Conservation, Bureau of Parks and Lands	$2,210,000	$2,210,000	$2,030,000	$2,030,000	$136,000	$136,000	$1,820,000	$1,820,000	$172,000	$172,000
	Maine Department of Inland Fisheries and Wildlife	$255,000	$255,000	$205,000	$205,000	$13,800	$13,800	$156,000	$156,000	$14,800	$14,800
	Private Timber Lands	$450,000	$450,000	$437,000	$437,000	$29,400	$29,400	$421,000	$421,000	$39,800	$39,800
	Conservation NGO	$1,610,000	$1,610,000	$1,460,000	$1,460,000	$98,300	$98,300	$1,310,000	$1,310,000	$123,000	$123,000
Unit 2: Minnesota	Superior National Forest	$10,400	$20,800	$10,200	$20,400	$686	$1,370	$9,950	$19,900	$939	$1,880
	State DNR lands	$3,240,000	$3,250,000	$2,970,000	$2,980,000	$200,000	$200,000	$2,670,000	$2,680,000	$252,000	$253,000

UNIT	SUBUNIT	TOTAL POST-DESIGNATION COSTS (UNDISCOUNTED)		TOTAL POST-DESIGNATION COSTS (PRESENT VALUE 3%)		TOTAL POST-DESIGNATION COSTS (ANNUALIZED 3%)		TOTAL POST-DESIGNATION COSTS (PRESENT VALUE 7%)		TOTAL POST-DESIGNATION COSTS (ANNUALIZED 7%)	
PROPOSED FOR CRITICAL HABITAT DESIGNATION		LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Unit 3: Northern Rockies	U.S. Fish and Wildlife Service	$254,000	$254,000	$204,000	$204,000	$13,700	$13,700	$156,000	$156,000	$14,700	$14,700
	U.S. Bureau of land Management	$226,000	$226,000	$179,000	$179,000	$12,000	$12,000	$132,000	$132,000	$12,500	$12,500
	Montana Department of Natural Resources and Conservation	$944,000	$944,000	$745,000	$745,000	$50,100	$50,100	$575,000	$575,000	$54,300	$54,300
	Montana Department of Fish, Wildlife & Parks	$343,000	$343,000	$288,000	$288,000	$19,300	$19,300	$232,000	$232,000	$21,900	$21,900
	Montana University System	$350,000	$350,000	$294,000	$294,000	$19,800	$19,800	$238,000	$238,000	$22,400	$22,400
	Idaho State Land	$230,000	$230,000	$182,000	$182,000	$12,200	$12,200	$135,000	$135,000	$12,800	$12,800
	Conservation NGO	$434,000	$434,000	$372,000	$372,000	$25,000	$25,000	$309,000	$309,000	$29,100	$29,100
Unit 4: North Cascades	Washington Department of Natural Resources	$557,000	$557,000	$517,000	$517,000	$34,700	$34,700	$471,000	$471,000	$44,500	$44,500
TOTAL		**$12,800,000**	**$12,800,000**	**$11,400,000**	**$11,400,000**	**$766,000**	**$767,000**	**$9,950,000**	**$9,970,000**	**$939,000**	**$941,000**

UNIT	SUBUNIT	TOTAL POST-DESIGNATION COSTS (UNDISCOUNTED)	TOTAL POST-DESIGNATION COSTS (PRESENT VALUE 3%)	TOTAL POST-DESIGNATION COSTS (ANNUALIZED 3%)	TOTAL POST-DESIGNATION COSTS (PRESENT VALUE 7%)	TOTAL POST-DESIGNATION COSTS (ANNUALIZED 7%)
PROPOSED FOR EXCLUSION						
Unit 2: Minnesota	Voyageurs National Park	$1,080,000	$981,000	$65,900	$874,000	$82,500
Unit 3: Northern Rockies	Glacier National Park	$5,720,000	$5,310,000	$357,000	$4,860,000	$459,000
	Bureau of Land Management	$227,000	$208,000	$13,900	$186,000	$17,600
Unit 4: North Cascades	North Cascades National Park	$531,000	$462,000	$31,000	$391,000	$36,900
	Lake Chelan National Recreation Area	$413,000	$353,000	$23,700	$291,000	$27,500
TOTAL		**$7,970,000**	**$7,320,000**	**$492,000**	**$6,600,000**	**$623,000**

6.2 METHODS AND ASSUMPTIONS

6.2.1 LYNX MANAGEMENT METHODS AND ASSUMPTIONS

186. Where information is available describing specific lynx management strategies in particular areas, this analysis quantifies the impacts of implementing the specific strategy. Where specific information regarding potential future lynx management efforts is not available, this analysis assumes that these land areas will undertake conservation efforts as outlined in the LCAS.[149] Exhibit 6-3 presents conservation guidelines in the LCAS related to public lands management.

EXHIBIT 6-3. LCAS STANDARDS RELATED TO PUBLIC LANDS MANAGEMENT

LCAS STANDARDS
PROGRAMMATIC AND PROJECT PLANNING
1. Lynx habitat will be mapped using criteria specific to each geographic area to identify appropriate vegetation and environmental conditions.
2. Prepare a broad-scale assessment of landscape patterns that compares historical and current ecological processes and vegetation patterns.
WILDFIRE (PRESCRIBED BURNS, AND SUPPRESSION ACTIVITIES)
1. In the event of a large wildfire, conduct a post-disturbance assessment prior to salvage harvest, particularly in stands that were formerly in late successional stages, to evaluate potential for lynx denning and foraging habitat.
2. Design burn prescriptions to regenerate or create snowshoe hare habitat (e.g., regeneration of aspen and lodgepole pine).[150]
LAND EXCHANGES
1. Develop and implement specific management prescriptions to protect/ enhance key linkage areas.
2. Evaluate proposed land exchanges, land sales, and special use permits for effects on key linkage areas.[151]
GRAZING
1. Do not allow livestock use in openings created by fire or timber harvest that would delay successful regeneration of the shrub and tree components.
2. Manage grazing in aspen stands to ensure sprouting and sprout survival sufficient to perpetuate the long-term viability of the clones.
3. Within the elevational ranges that encompass forested lynx habitat, shrub-steppe habitats should be considered as integral to the lynx habitat matrix and should be managed to maintain or achieve mid seral or higher condition.
4. Within lynx habitat, manage livestock grazing in riparian areas and willow carrs to maintain or achieve mid seral or higher condition to provide cover and forage for prey species.[152]

[149] Ruediger, B., et. al. 2000. Canada lynx conservation assessment and strategy 2nd Edition. August 2000 (as amended Oct. 23-24, 2001, May 6-8, 2003 and Nov. 12-13, 2003). USDA Forest Service, U.S. Fish and Wildlife Service, Bureau of Land Management, and National Park Service. Forest Service Publication #R1-00-53.

[150] Ruediger, B., et. al. 2000, page 7-7

[151] Ruediger, B., et. al. 2000, page 7-16.

[152] Ruediger, B., et. al. 2000, page 7-11.

187. This analysis applies a cost of $6 per acre for development of lynx management plans; this estimate is a weighted average per acre estimate of established lynx management plans as highlighted in Exhibit 6-4. Exhibit 6-5 highlights the areas to which this estimated per acre cost is applied.

EXHIBIT 6-4. LYNX MANAGEMENT PLAN DEVELOPMENT COSTS

PLAN	AGENCY	NUMBER OF ACRES	PER ACRE COST
Maine Tribes [1] [2]	Penobscot Tribe and Passamaquoddy Tribe	83,988	$12
Grand Portage Tribe [3]	Grand Portage Tribe	47,725	$3
Montana Department of Natural Resources and Conservation HCP [4]	MTDNRC	147,843	$1
Lynx Habitat Management Plan for DNR-Managed Lands [5]	WADNR	126,212	$14
Plum Creek Cascade Habitat Conservation Plan [6]	Plum Creek	170,000	$6
BLM Resource Management Plan [7]	BLM Missoula Field Office	147,000	$1
WEIGHTED AVERAGE PER ACRE COST			**$6**

Sources:

1. Passamaquoddy Tribe. 2003. Population assessment and forest management planning for the Canada lynx and other rare and endangered forest carnivores on Passamaquoddy Tribal lands in Maine. Tribal Landowner Incentive Program.
2. Email communication from Mark McCollough, March 10, 2006. Penobscot Tribe grant for development of lynx plan will have the same costs as the Passamaquoddy plan, see (1).
3. Email communication from Seth Moore, Biologist, Grand Portage Reservation, March 23, 2006.
4. MTDNRC. 2005. Forested Trust Land Habitat Conservation Plan. Canada Lynx Conservation Strategy.
5. WADNR. 2005. Draft Lynx Habitat Management Plan for DNR-Managed Lands.
6. Plum Creek Timber Company. 1996. Plum Creek's Cascades Habitat Conservation Plan.
7. Personal Communication, George Hirschenberger, Missoula Field Office, Bureau of Land Management, April 5, 2006.

EXHIBIT 6-5. PUBLIC AND CONSERVATION LANDS WITHOUT EXISTING OR PROPOSED LYNX MANAGEMENT PLANS

UNIT	SUB AREA	LANDS INCLUDED	ACRES
PROPOSED FOR CRITICAL HABITAT DESIGNATION			
Unit 1: Maine	National Park Service	Appalachian Trail	10,054
	U.S. Fish and Wildlife Service		41
	Maine Department of Conservation, Bureau of Parks and Lands	State Parks, Management Units	346,676
	Maine Department of Inland Fisheries and Wildlife	2 Wildlife Management Areas	4,965
	Baxter State Park Authority	Baxter State Park	205,436
	The Nature Conservancy	Conservation lands (except for the St. John River area)	240,890
	The Forest Society of Maine	Conservation lands	
	The Appalachian Mountain Club	Conservation lands	
Unit 2: Minnesota	Minnesota Department of Natural Resources	State Parks, State Forests, Wildlife Management Areas, Scientific and Natural Areas	507,473
Unit 3: Northern Rockies	U.S. Fish and Wildlife Service	Benton Lakes Wetland Management District	4,784
	Montana Department of Natural Resources Conservation	Trust land areas in critical habitat not covered by HCP	57,902
	Montana Department of Fish, Wildlife, and Parks	State Parks, Wildlife Management Areas	20,465
	Montana University System	Lubrecht Forest	21,656
	Idaho Department of Land*	State land	646
	Conservation NGO	Various parcels	36,201
CONSIDERED FOR EXCLUSION			
Unit 2: Minnesota	National Park Service	Voyageurs National Park	126,149
Unit 3: Northern Rockies	National Park Service	Glacier National Park	871,668
Unit 4: North Cascades	National Park Service	North Cascades National Park	53,135
	National Park Service	Lake Chelan National Recreation Area	32,665

Source: Acreage: Maine Landownership Information. GIS data layer maintained by J.W. Sewall Company, Old Town, Maine. Last updated, December 9, 2005. Received December 22, 2005.
Existence of management plans determined through contact with stakeholders in the subunits presented.
* The Idaho Department of Land is in the early stages of developing a lynx management plan, but no draft currently exists. Personal Communication, Patrick Seymour, Idaho Department of Lands, March 10, 2006.

188. In addition to plan development costs, implementation costs are forecast for monitoring and surveying. Information from the Washington Department of Fish and Wildlife's (WADFW) 2001 Lynx Recovery Plan suggests costs of these efforts may be approximately $45,230 per year for five years.[153]

6.2.2 RESEARCH AND GRAZING ACTIVITY METHODS AND ASSUMPTIONS

189. Existing and planned lynx research activities are quantified based on available information. Where possible, costs are presented for the subunit in which the activity occurred. Absent this information, costs are presented for the subunit landowner that provided funding for the research.

190. A limited amount of grazing occurs within the study area. Absent specific information regarding how grazing activities may be affected by lynx conservation, this analysis provides information on the level of grazing activity in the study area, and the regional economic contribution of grazing activities.

6.3 LYNX MANAGEMENT

191. This section quantifies the development and implementation of management plans incorporating lynx conservation measures.

6.3.1 UNIT 1: MAINE

6.3.1.1 Pre-Designation Impacts

192. Except for a portion of Nature Conservancy lands (see below), none of the public or conservation lands in Maine have developed lynx management plans; thus, no pre-designation impacts are estimated.

6.3.1.2 Post-Designation Impacts

193. The total post-designation cost of developing and implementing lynx management plans in Unit 1 is $5.76 million in undiscounted dollars (a present value of $4.60 million applying a seven percent discount rate or $5.20 million applying a three percent discount rate).

194. Because no lynx plans are currently in place or proposed for all land parcels in Maine, post-designation impacts of lynx management plan development are estimated by applying the average cost for development of a lynx management plan, $6 per acre, to the following lands:

- **National Park Service -** Management of the area owned by the National Park Service is limited to maintenance of the Appalachian Trail.
- **Maine Department of Conservation -** State Parks and Public Reserved Lands are managed by the Department of Conservation, Bureau of Parks & Lands (Bureau).

[153] Stinson, D.W. 2001. Washington State Recovery Plan for the lynx. Washington Department of Fish and Wildlife, Olympia, Washington. 78pp. +5 maps.

The Bureau acquires lands, sometimes partially federally funded, to manage for conservation, and to consolidate areas it manages.

- **Maine Department of Inland Fisheries and Wildlife (IF&W) -** IF&W owns five Wildlife Management Areas within the study area, ranging from 90 to over 3,000 acres.
- **Baxter State Park Authority -** Baxter State Park is managed for primitive wilderness experiences with strict guidelines limiting the development of roads, trails, and campsites.[154] Trust for Public Land (TPL) is currently brokering a deal which includes the annexation of a 6,015 acre parcel to Baxter State Park.[155] The potential change in ownership could provide a conservation benefit for the lynx as this parcel currently allows snowmobiling and hunting; it is possible that those activities may be limited if the parcel is managed similarly to Baxter State Park. [156]
- **The Nature Conservancy (TNC) -** The TNC Maine Chapter owns several parcels of land in Maine, including a 181,000 tract near the Canadian border.[157] Part of this land, the Upper St. John River area, has a management plan that contains lynx conservation efforts.[158] Costs of developing and implementing this plan are not available.[159] There are no specific lynx management conservation measures governing other TNC lands in the study area; therefore, average per-acre costs are applied to all of the TNC lands.
- **The Forest Society of Maine -** The Forest Society owns 959 acres within the study area.
- **The Appalachian Mountain Club (AMC) -** The AMC maintains sections of the Appalachian trail in Maine. In 2003, the AMC purchased 37,000 acres of forestland known as the Katahdin Iron Works near Moosehead Lake.[160] AMC is creating a 10,000-acre ecological reserve, and will sustainably manage the remaining acreage as working forest.[161] Costs of managing these lands for the benefit of the lynx are included in this analysis.

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[154] Personal Communication with Jean Hookwater, Baxter State Park Naturalist, March 28, 2006.

[155] The Trust for Public Land, "Agreement Would Add 6K Acres to Baxter State Park (ME)" January 25, 2006. http://www.tpl.org/tier3_cd.cfm?content_item_id=20428&folder_id=259 (Accessed March 28, 2006).

[156] Personal Communication, Jean Hookwater, March 28, 2006.

[157] Personal Communication with Bill Patterson, The Nature Conservancy – Maine Chapter, February 23, 2006. Note that this acreage differs from the ownership provided in the Service's GIS layer of 76,724 acres.

[158] Stockwell, et al. 2004. The Nature Conservancy. Upper St. John River Forest: Forest Management Plan, April 25, 2003. Update: September 2004. p.5

[159] Personal communication, Bill Patterson, February 24, 2006. The Managed Forest portion of this area is discussed in the Section 3 of this analysis.

[160] Personal Communication, Gary Whiting. Project Director for the Maine Woods Initiative. Appalachian Mountain Club. April 6, 2006.

[161] http://www.outdoors.org/conservation/wherewework/maine/mwi-conservation.cfm (accessed April 3, 2006).

6.3.2 UNIT 2: MINNESOTA

6.3.2.1 Pre-Designation Costs

195. The total pre-designation costs of developing and implementing lynx management plans for areas proposed for designation in Unit 2 is estimated to be $39,500 in undiscounted dollars for development of the Superior National Forest's Forest Management Plan and MNDNR staff time spent considering lynx management.[162,163] Lynx conservation efforts outlined in Superior National Forest's Forest Management Plan are outlined in Exhibit 6-6

EXHIBIT 6-6. SUPERIOR NATIONAL FOREST - FOREST PLAN GUIDELINES FOR CANADA LYNX

SUPERIOR FOREST PLAN LYNX GUIDELINES
G-WL-2 - Provide for the protection of known active den sites during denning season.
G-WL-5 - Following a disturbance on NFS land greater than 20 contiguous acres (such as a blowdown, fire, insect or disease) that could contribute to lynx denning habitat, generally retain a minimum of 10% of the affected area on NFS land unless salvage or management-ignited fire is necessary to address human health and safety (such as in the Wildland Urban Interface) or scenic integrity.
G-WL-7 - For newly constructed snow-compacting trails, effectively close or restrict to public access those trails and OML 1, OML 2, temporary, and unclassified roads that intersect the new trails unless these trails or roads are being used for other management purposes
G-WL-9 - Dirt and gravel roads that are under the jurisdiction of the National Forest and that traverse lynx habitat on NFS land (particularly those roads that could become highways) should generally not be paved or otherwise upgraded in a manner that is likely to lead to significant increases to lynx mortality or substantially impedes movement and dispersal. If the dirt and gravel roads described above are upgraded or paved in order to meet human health and safety or other environmental concerns and essential management needs, conduct a thorough analysis on effects to lynx and its habitat to determine minimum road design standards practical (including measurements to minimize traffic speeds), to minimize or avoid foreseeably contributing to increases in human activity or adverse impacts to lynx and its habitat.
Source: Superior National Forest, 2004 Final Forest Plan, pgs. 2-29 - 2-31.

6.3.2.2 Post-Designation Costs

196. The total post-designation cost of developing and implementing lynx management plans in areas proposed for designation in Unit 2 is $3.23 million in undiscounted dollars (a present value of $2.66 million applying a seven percent discount rate or $2.96 million applying a three percent discount rate). The total cost for these activities in areas proposed for exclusion is $949,000 in undiscounted dollars (a present value of $747,000 applying a seven percent discount rate or $851,000 applying a three percent discount rate).

197. These impacts are associated with development and implementation of lynx management plans by the following landowners:

[162] Personal Communication, Rich Baker, Minnesota Department of Natural Resources, February 8, 2006. These costs may be understated as additional staff time may be devoted to lynx efforts.

[163] Personal Communication, Mary Shedd, Wildlife Biologist, Superior National Forest, February 21, 2006.

- **Superior National Forest -** Implementation costs related to lynx conservation efforts in the Superior National Forest Plan are primarily related to changes in timber management practices, and are therefore quantified in Section 3 of this report.
- **Minnesota Department of Natural Resources -** MNDNR currently spends staff time to consider lynx conservation associated with its land management, and expect this to continue into the foreseeable future. [164]
- **Voyageurs National Park -** Voyageurs National Park, considered for exclusion from critical habitat, recently consulted with the Service on its Draft Wildland Fire Management Plan in 2002. There were no modifications to this plan for the benefit of the lynx.

6.3.3 UNIT 3: NORTHERN ROCKIES

6.3.3.1 Pre-Designation Costs

198. The total pre-designation costs of developing and implementing lynx management in areas proposed for designation in Unit 3 are $291,000. This is associated with the ongoing development of the MTDNRC Habitat Conservation Plan (HCP) for their forested trust lands; the lynx is one of the species covered by this HCP. Specific conservation efforts included in the draft lynx conservation strategy published by MTDNRC in October 2005 are illustrated in Exhibit 6-7. Spending on the HCP thus far has been for development of administrative rules, policy implementation, and critical habitat evaluation.[165]

199. The total pre-designation costs for these activities in areas proposed for exclusion from critical habitat are $14,300. These costs are associated with the participation of staff at Glacier National Park in the development of the LCAS. While Glacier National Park does not have a formal lynx management plan in place, it uses the LCAS guidelines in its management.

6.3.3.2 Post-Designation Costs

200. The total post-designation cost of developing and implementing lynx management plans in Unit 3 for areas proposed for critical habitat designation is $2.78 million in undiscounted dollars (a present value of $1.78 million applying a seven percent discount rate and $2.26 million applying a three percent discount rate). The total post-designation cost for these activities in areas proposed for exclusion is $5.45 million in undiscounted dollars (a present value of $4.56 million applying a seven percent discount rate and $5.03 million applying a three percent discount rate).

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[164] Personal Communication, Rich Baker, February 8, 2006.

[165] Email communication from Mike O'Herron, Montana Department of Natural Resources and Conservation, February 14. 2006.

EXHIBIT 6-7. MTDNRC DRAFT LYNX CONSERVATION STRATEGY

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION DRAFT LYNX GUIDELINES
1. Minimize potential for disturbance to known active den sites.
2. Within preferred habitat types, map habitats potentially used by lynx, including winter foraging habitat, young foraging habitat, other suitable habitat, and temporary non-suitable habitat.
3. Provide stand structures or attributes that offer habitat for prey species, particularly in winter
4. Retain coarse woody debris and other denning attributes on managed sites.
5. Limit conversion of suitable lynx habitat to temporary non-suitable habitat per decade in geographic areas of notable importance for lynx (termed lynx management areas or [LMAs]).
6. Ensure that adequate amounts of foraging habitat are maintained in defined LMAs.
7. Provide for habitat connectivity on the landscape where vegetation and ownership patterns allow.
8. Provide assurances for maintenance of suitable lynx habitat on DNRC scattered lands outside LMAs.
Source: MTDNRC Forested Trust Land Habitat Conservation Plan (HCP), Canada Lynx Conservation Strategy. October 2005.

201. These impacts are associated with development and implementation of lynx management plans by the following landowners:

- **U.S. Fish and Wildlife Service - Benton Lakes Wetland Management District -** The mission of the District is to protect wetlands and surrounding grasslands for the benefit of waterfowl and other wildlife.
- **Montana Department of Natural Resources and Conservation -** As mentioned above, MTDNRC is developing a lynx HCP for their forested trust lands. Total forecast costs comprise continued development of the HCP and its implementation, as well as costs estimated for areas within the study area that are not covered by the draft HCP.
- **Montana Department of Fish Wildlife and Parks -** The Montana Department of Fish Wildlife and Parks (MTDFWP) manages certain State Parks, fishing access sites, and Wildlife Management Areas within the study area.[166] In the future, MTDFWP may purchase lands or hold easements from The Nature Conservancy (see below), but how these areas may be managed for the benefit of the lynx has not been determined.[167]

[166] Personal Communication, Sue Dalbey, Montana Department of Fish, Wildlife, and Parks, provided via email, March 9, 2006.

[167] Personal Communication, Chaz Van Genderen, Montana Department of Fish, Wildlife, and Parks. March 7, 2006.

- **TNC -** The TNC Montana Chapter is in the process of purchasing 88,092 acres of Plum Creek timberlands and re-selling them to Federal, state, and private buyers.[168] These lands currently support a variety of activities including grazing, timber management, and recreation.
- **Montana University System -** The Montana University System operates Lubrecht Experimental forest within the study area.
- **Glacier National Park -** Glacier National Park is considered for exclusion from critical habitat. As the Park currently lacks an explicit lynx management plan, this analysis estimates the costs to the park of developing such a plan.
- **Bureau of Land Management -** BLM lands are considered for exclusion from critical habitat. The Butte District Field Office is in the process of updating their resource management plan in accordance with the guidelines outlined in the LCAS. Based on the costs incurred by the BLM Missoula District, the cost of adopting LCAS management into the Butte District's resource management plan, and carry out continued monitoring and surveying, is expected to be $226,000.[169]

6.3.4 UNIT 4: NORTH CASCADES

6.3.4.1 Pre-Designation Costs

202. The total pre-designation cost of developing and implementing lynx management plans for areas proposed for critical habitat designation in Unit 4 is $859,000. These costs are associated with the WADNR development of its Lynx Habitat Management Plan, which covers most of Loomis State Forest within the study area.

203. The total pre-designation cost for areas proposed for exclusion is $1,800. These costs are for lynx management efforts in North Cascades National Park.

6.3.4.2 Post-Designation Costs

204. The total post-designation cost of developing and implementing lynx management plans for areas proposed for designation in Unit 4 is $557,000 in undiscounted dollars (a present value of $471,000 applying a seven percent discount rate or $517,000 applying a three percent discount rate). The total post-designation cost for these activities in areas proposed for exclusion is $944,000 in undiscounted dollars (a present value of $682,000 applying a seven percent discount rate or $815,000 applying a three percent discount rate).

205. These impacts are associated with development and implementation of lynx management plans by the following landowners:

- **Washington Department of Natural Resources -** Post-designation costs for continued development and implementation of WADNR's lynx management plan

168 Personal Communication, Maria Mantas, The Nature Conservancy, February 23, 2006.

[169] Personal Communication, George Herschenberger, Bureau of Land Management, Missoula Field Office. April 5, 2006. Cost is 15 months of staff time multiplied by $5,000, the per-month employee cost BLM uses to develop its budgets.

will continue into 2007. The Loup Loup block, and some portions of Loomis State Forest were not included in the WADNR's plan because they are not considered to include lynx habitat. This analysis assumes per-acre costs similar to those already incurred for the WADNR plan development would be required for these areas.

- **North Cascades National Park, Lake Chelan National Recreation Area** - Both areas are managed as part of the North Cascades National Park Service Complex.

6.4 LYNX CONSERVATION RESEARCH

206. Exhibits 6-8 and 6-9 summarize pre- and post-designation impacts related to lynx research efforts.

EXHIBIT 6-8. PRE-DESIGNATION LYNX RESEARCH IMPACTS

UNIT	SUBUNIT	DESCRIPTION OF LYNX RESEARCH EFFORT	PRE-DESIGNATION ECONOMIC IMPACT (PRESENT VALUE 7%)
AREAS PROPOSED FOR DESIGNATION			
Unit 1: Maine	Maine Department of Inland Fisheries and Wildlife	Radio-tagging studies, snow-tracking, and associated administrative support and partnerships with landowners. (1)	$1.72 million
	University of Maine	Snowshoe hare and lynx research.(2)	$631,000
Unit 2: Minnesota	Superior National Forest	Research such as lynx radio collaring and tracking has been conducted by the Natural Resources Research Institute on Superior NF and State lands. An estimated 10-15 percent of research activities occurred within the study area. These costs are borne by a variety of funding entities, including: U.S. Forest Service, U.S. Geological Survey, MN DNR, University of Minnesota, and the National Council for Air and Stream Improvement. (3)	$33,600 -$67,000
	Minnesota Department of Natural Resources		$33,600 -$67,000
Unit 3: Northern Rockies	MTDNRC	Study of snowshoe hares on its lands to understand where lynx populations might occur. (5)	$18,600
Unit 4: North Cascades	WADNR	Lynx habitat research on the Loomis State Forest. Funded by the following entities: Seattle City Light; USFS Pacific Northwest Research Station; Washington Department of Fish and Wildlife; and, US Fish and Wildlife Service. (7)	$219,000
AREAS CONSIDERED FOR EXCLUSION			
Unit 2: Minnesota	Voyageurs National Park	Snow-tracking research to monitor lynx since 2000. (4)	$53,000
Unit 3: Northern Rockies	Glacier National Park	DNA Research project (2000-2001); Tracking surveys pilot project; Lynx telemetry study; Snowshoe Hare Study.(6)	$1.07 million - $1.44 million

Unit 4: North Cascades	North Cascades National Park	Conducted inventory to document the presence and distribution of lynx, wolverine, fisher, and martin, and develop habitat models.[8]	$161,000

Notes:
(1) Personal Communication with Ken Elowe, Ph.D., Maine Department of Inland Fisheries and Wildlife, February 24, 2006.
(2) Personal Communication, Professor Daniel J. Harrison, University of Maine, July 18, 2006. Absent more specific information, costs are presented for the private landowner type.
(3) Personal Communication, Ron Moen, Ph.D., Natural Resources Research Institute. February 23, 2006, and April 7, 2006. Absent more specific information, costs are presented as split evenly between Superior NF and MN DNR lands where research occurs. Acreage in these areas in the study area is similar.
(4) Personal Communication, Steve Windels, February 15, and 21, and March 3, 2006
(5) Email communication from Mike O'Herron, February 13, 2006.
(6) Personal communication from Steve Gniadek, January 11. 2006. Preliminary estimates.
(7) Personal Communication, Keith Aubry, Ph.D. Research Wildlife Biologist. United States Forest Service - Pacific Northwest Research Station, March 6, 2006.
(8) Personal Communication, Roger Christophersen and Robert Kuntz, North Cascades National Park. March 2, 2006.

EXHIBIT 6-9. POST-DESIGNATION LYNX RESEARCH IMPACTS

UNIT	SUBUNIT	DESCRIPTION OF LYNX RESEARCH EFFORT	POST-DESIGNATION ECONOMIC IMPACT (PRESENT VALUE 7%)
AREAS PROPOSED FOR DESIGNATION			
Unit 1: Maine	Maine Department of Inland Fisheries and Wildlife	Radio-tagging studies, snow-tracking, and associated administrative support and partnerships with landowners. [1]	$421,000
	University of Maine		
Unit 2: Minnesota	Superior National Forest	Research such as lynx radio collaring and tracking has been conducted by the Natural Resources Research Institute on Superior NF and State lands. These costs are borne by a variety of funding entities (see table 6-9), but the bulk of future funding will come from MN DNR.[2]	$9,950 - $19,900
	Minnesota Department of Natural Resources		$9,950 - $19,900
AREAS CONSIDERED FOR EXCLUSION			
Unit 2: Minnesota	Voyageurs National Park	Research lynx presence and habitat on its lands.[3]	$128,000
Unit 3: Northern Rockies	Glacier National Park	Snowshoe hare study[4]	$484,000

Notes:
(1) Personal Communication with Ken Elowe, Ph.D., Maine Department of Inland Fisheries and Wildlife, February 24, 2006.
(2) Personal Communication, Ron Moen, Ph.D., Natural Resources Research Institute. April 7, 2006.
(3) Personal Communication, Steve Windels, February 15, and 21, and March 3, 2006
(4) Personal communication from Steve Gniadek, January 11. 2006. Preliminary estimates.

6.5 GRAZING

207. Livestock grazing is identified in the LCAS as a risk to Canada lynx productivity.[170] Domestic livestock or wild ungulates may change the structure or composition of native plant communities, thus changing their ability to support lynx and their prey - the snowshoe hare - that forages on the same vegetation. "Livestock grazing may have the greatest potential to impact snowshoe hare habitat and populations, thus indirectly affecting lynx, in aspen stands and in high elevation riparian willow communities, and additionally in shrub-steppe habitats within fragmented forest areas."[171] Exhibit 6-3 lists the LCAS standards associated with grazing.

208. Grazing activities that have warranted consultation in the past include grazing allotment permit issuance, allotment reorganization, and fencing. Conservation efforts for the lynx associated with these activities have included: managing sheep and cows to prevent grazing concentration in areas that might contain lynx and snowshoe hare habitat and foraging habitat; using fencing instead of woody debris as a more permanent boundary between grazing areas and lynx and hare habitat; and monitoring and reporting on foraging conditions.

209. Limited levels of grazing are known to occur in Units 3 and 4 of the study area. While information is available on the level of grazing activity, the extent to which it occurs in areas that contain lynx or snowshoe hare foraging habitat is unknown. It is therefore uncertain whether fencing of the areas would be required.

210. This analysis provides information on the extent of grazing, the value of the animal units (cattle, or "AUMs"), and the regional economic contribution of grazing to the local economies.

6.5.1 UNIT 3: NORTHERN ROCKIES

211. Grazing occurs on approximately 65,700 acres of State Trust lands in Montana within the study area. These acres support approximately 11,000 AUMs under 119 leases (87 different lease holders).[172] Additionally, on TNC lands within the study area, there are 16 allotments totaling 21,566 acres, and supporting 1,958 AUMs.[173] The approximate current livestock production value of these AUM's is $793,000.[174]

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[170] The LCAS standards for grazing are listed in Exhibit 6-3.

[171] Ruediger, B., et. al. 2000, pp 2-12 to 2-13.

[172] Personal Communication, Kevin Chappell, Agriculture and Grazing Bureau Management Chief, Montana Department of Natural Resources and Conservation, March 20, 2006.

[173] Personal Communication, Steve Kloetzel, Land Steward, The Nature Conservancy - Montana Chapter, March 7, 2006. AUMs estimated as of summer 2005.

[174] U.S. Department of Agriculture National Agricultural Statistics Service. 2004. "Statistics of Cattle, Hogs, and Sheep" Chapter VII in Agricultural Statistics 2004. Available at: http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp.

6.5.2 UNIT 4: NORTH CASCADES

212. There are seven grazing allotments on Loomis State Forest, and two on the Loup Loup block. Currently, grazing occurs on 101,027 acres (over 96 percent) of State lands in the study area. These areas annually support 13,570 AUM's on the Loomis State Forest, and 4,851 AUM's on the Loup Loup block.[175] The approximate current livestock production value of these AUM's is $1,159,000.[176]

213. Each permit has to have a Resource Management Plan (RMP), and be compliant with House Bill (HB) 1309.[177] HB 1309 contains guidelines and standards for land management and aquatic evaluation. The WADNR lynx management plan does not place any additional restrictions on grazing leases, beyond compliance with the bill. The RMP's are developed on a site-specific basis, and are designed to maintain the native plant communities and plant species diversity, but not to address the specific needs of individual species, including snowshoe hare, and lynx.[178]

214. The Washington Cattlemen's Association (WCA) has expressed concern that designation of critical habitat on WADNR lands where they hold grazing permits may require additional effort on their part.[179] Their primary concerns are that current management of grazing lands might change, and no longer allow the use of transitory range. Transitory range is composed of grasses and early successional species that grow in after a timber harvest, thinning, or fire. WCA estimates that within the study area, 10 to 15 percent of the grazing acres are currently in transitory range areas. The development of this kind of range would be governed by the WADNR's timber practices, or the unpredictable occurrences of fires. Ranchers in the area have been operating under the WADNR's requirement for RMPs since 2002, and to date, the lynx plan has not affected their grazing activities.[180]

6.5.3 IMPLAN ANALYSIS OF REGIONAL ECONOMIC CONTRIBUTION OF GRAZING IN NORTHERN ROCKIES AND NORTH CASCADES UNITS

215. This analysis utilizes IMPLAN (as described in Section 5 of this analysis) to estimate indirect and induced impacts on the region in terms of output and jobs.

216. For purposes of the regional economic analysis, the study area in Montana includes Flathead, Missoula, Powell, Granite and Lewis and Clark Counties. In Washington, it is Okanogan County. Any restrictions in grazing activity would primarily affect the livestock-related sectors of the economy. Decreased operations in these industries may

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[175] Personal Communication, Scott Fisher, Washington Department of Natural Resources, March 16, 2006.

[176] U.S. Department of Agriculture National Agricultural Statistics Service. 2004. "Statistics of Cattle, Hogs, and Sheep" Chapter VII in Agricultural Statistics 2004. Available at: http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp.

[177] HB 1309. 1994. Ecosystem Standards for State-owned agriculture and grazing land. State of Washington Conservation Commission.

[178] Draft WA DNR lynx habitat management plan, pages 51-52.

[179] Personal Communication, Jerry Barnes and Jack Field, Washington Cattlemen's Association. February 13, 2006.

[180] Personal Communication, Jerry Barnes, April 4, 2006.

also result in secondary effects on related sectors in the study area. Some of these related sectors may be closely associated with livestock, such as feed grains and hay and pasture; while others may be less closely associated with the industry, such as the insurance sector. This analysis relies on regional economic modeling to estimate the economic contribution of these initial and secondary sectors.

217. Exhibit 6-10 presents the results of the IMPLAN analysis. The current contribution of livestock production is shown to total $1,410,000 in Unit 3 (2006 dollars) in regional output and approximately 22.7 jobs across all sectors of the economy. In Unit 4 the current contribution of livestock production is shown to total $2,200,000 in regional output and approximately 30.6 jobs. These contributions represent less than one percent of total output from the livestock industry: 0.01 percent in Montana, and 0.17 percent in Washington.

EXHIBIT 6-10. RESULTS OF IMPLAN ANALYSIS

UNIT	DIRECT EFFECT (OUTPUT)	INDIRECT AND INDUCED EFFECTS (OUTPUT)	TOTAL IMPACT (OUTPUT)	EMPLOYMENT (JOBS)	PERCENTAGE OF TOTAL PRODUCTION
3: Northern Rockies (MTDNRC)	$787,000	$623,000	$1,410,000	22.7	0.01047%
4: North Cascades	$1,150,000	$1,050,000	$2,200,000	30.6	0.17132%

*Regional economic impact measures represent one-time changes in economic activity (i.e., not present values).

6.6 WILDLAND FIRE MANAGEMENT

6.6.1 BACKGROUND

218. Various agencies and private parties may conduct fire management activities within the study area. The LCAS identifies salvage logging after a wildfire as a potential risk to lynx, which use large downed woody debris as den sites. It also notes the changes in vegetative composition of habitats for snowshoe hare and lynx that follow a fire, and recommends designing burn prescriptions to minimize any habitat losses (see Exhibit 6-3). The following fire management project planning guidelines are also given in the LCAS, designed to reduce risk to lynx:

- Design burn prescriptions to promote response by shrub and tree species that are favored by snowshoe hare.
- Design burn prescriptions to retain or encourage tree species composition and structure that will provide habitat for red squirrels or other alternate prey species.

- Consider the need for pre-treatment of fuels before conducting management ignitions.
- Avoid constructing permanent firebreaks on ridges or saddles in lynx habitat.
- Minimize construction of temporary roads and machine fire lines to the extent possible during fire suppression activities.[181]

219. There have been 18 formal and 17 informal past consultations in states within the study area for fire management, with the majority occurring on National Forest lands. These consultations were primarily for public lands vegetation management and fuels reductions, fire management plans, and silvicultural activities.

6.6.2 WILDLAND-URBAN INTERFACE AREAS WITHIN THE STUDY AREA

220. The following section presents data identifying the areas of Wildland-Urban Interface (WUI) where fire management activities are most likely to occur. WUI are areas where houses meet or intermingle with undeveloped wildland vegetation. This makes the WUI a focal area for human-environment conflicts such as wildland fires.[182]

221. This analysis relies on data developed by the University of Wisconsin that integrates U.S. Census and USGS National Land Cover Data to map WUI areas according to the Federal Register definition of WUI (Federal Register 66:751, 2001).[183]

222. WUI areas are composed of both "interface" and "intermix" communities. In both communities, housing must meet or exceed a minimum density of one structure per 40 acres. Intermix communities are places where housing and vegetation intermingle. Intermix areas are characterized by continuous wildland vegetation and more than 50 percent vegetation. Interface communities are areas with housing in the "vicinity" of contiguous vegetation, that is, areas with less than 50 percent vegetation but within 1.5 miles of an area over 1,325 acres (500 ha) that is more than 75 percent vegetated.

223. In estimating the WUI areas that overlap with the study area, this analysis excluded the following non-WUI areas: wildland intermix, uninhabited with vegetation, uninhabited and no vegetation, wildland with no vegetation, low density with no vegetation, medium density with no vegetation, high density with no vegetation, and very low density with vegetation.[184]

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[181] Ruediger, B., et. al. 2000, p. 7-7

[182] "The Wildland-Urban Interface," University of Wisconsin, Department of Forest Ecology & Management, Spatial analysis for conservation and sustainability (SILVIS) Lab, Online at: http://silvis.forest.wisc.edu/projects/WUI_Main.asp, Accessed on: June 1, 2006.

[183] "The Wildland-Urban Interface," University of Wisconsin, Department of Forest Ecology & Management, Spatial analysis for conservation and sustainability (SILVIS) Lab, Online at: http://silvis.forest.wisc.edu/projects/WUI_Main.asp, Accessed on: June 1, 2006.

[184] "The Wildland-Urban Interface," University of Wisconsin, Department of Forest Ecology & Management, Spatial analysis for conservation and sustainability (SILVIS) Lab, Online at: http://silvis.forest.wisc.edu/projects/WUI_Main.asp, Accessed on: May 26, 2006."

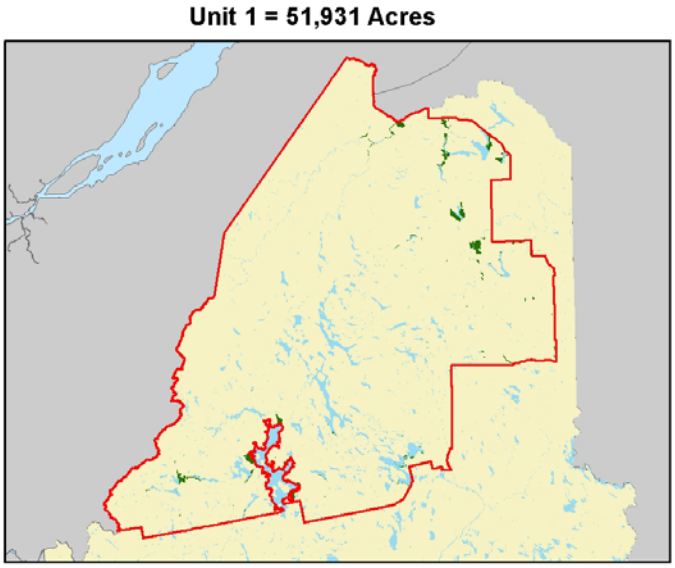
224. Based on an analysis of the WUI data, overlap of the study area with WUI areas totals 265,666 acres, or approximately two percent of the acres within the study area. Exhibit 6-12 illustrates (in dark green) the areas of WUI in Units 1 and 2.

EXHIBIT 6-11. WILDLAND-URBAN INTERFACE AREAS IN THE STUDY AREA

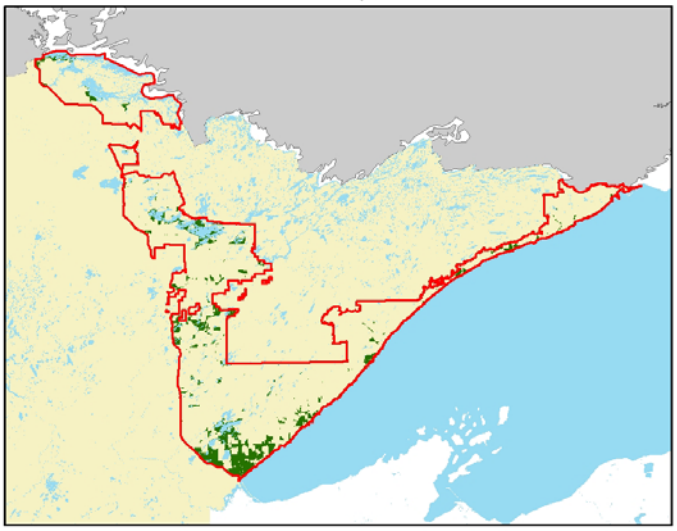
UNIT	STUDY AREA (ACRES)	OVERLAP WITH WUI (ACRES)	OVERLAP AS A PERCENT OF CRITICAL HABITAT ACRES IN UNIT
Unit 1: Maine	6,495,031	51,931	1%
Unit 2: Minnesota	2,066,494	194,374	9%
Unit 3: Northern Rockies	2,226,773	19,361	1%
Unit 4: North Cascades	193,457	0	0%
TOTAL	10,981,756	265,666	2%

Sources:
1) "The Wildland-Urban Interface," University of Wisconsin, Department of Forest Ecology & Management, Spatial analysis for conservation and sustainability (SILVIS) Lab, Online at: http://silvis.forest.wisc.edu/projects/WUI_Main.asp, Accessed on: May 26, 2006.
2) IEc GIS analysis of the study area.

EXHIBIT 6-12. WUI AREAS IN UNITS 1 AND 2



Unit 2 = 194,374 Acres



Unit 3 = 19,361 Acres